



Materials Engineering Branch

TIP*



No. 042 Bonding to Delrin

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Because of the high solvent resistance of Delrin acetal resins, they cannot be adequately bonded by adhesives or painted without special surface preparation. Molded surfaces especially are difficult to bond to because of their smoothness or glaze. A common bonding preparation is grit blasting. A less preferable method is simply abrading the smooth surface with abrasive paper or cloth, such as 280A grit emery cloth or Scotchbrite.

A chemical surface preparation technique, called "Satinizing, " is discussed in detail in DuPont's Delrin Design Handbook and is reported as providing optimum bond strength. This four-step process involves:

- (1) Immersion in a chemical bath¹ for 5-30 seconds at 80-120°C to initiate the "Satinizing" action. Bath time can be extended to 60-120 seconds by a reduction in acid concentration.
- (2) Oven exposure at 40-120°C to evaporate solvents and induce rapid etching. The depth of etch is controlled by the temperature and time of the oven exposure. At 120°C, adequate etching is achieved in about one minute. Steps 1 and 2 should be conducted in a well-ventilated hood area to evacuate the formaldehyde fumes that are evolved.
- (3) Wash by dip and spray with hot water to stop the etching action and remove the bath film.
- (4) Dry in a clean oven. A short high-temperature drying step of a few minutes at 120°C will reduce any tendency for formaldehyde vapors to be released. No mold releases, oils, fingerprints, or other contaminants should be allowed to settle on the parts during the drying step or afterward. The parts are ready for coating, bonding, or storage after the drying step.

¹ Composition (by weight) of "Satinizing" bath: 96.4 to 96.85 grams of perchloroethylene, 3.0 grams of 1,4 dioxane, 0.05 to 0.3 grams of p-toluenesulfonic acid and 0.1 to 0.3 grams of a solid assistant (eg: Cab-O-Sil).